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EXAMINER

MUNOZ, GUILLERMO

ART UNIT PAPER NUMBER

2637

DATE MAILED: 08/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/853,156

Applicant(s)

WANG ET AL.

Examiner

Guillermo Munoz

Art Unit

2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 12-20 is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 7-11 is/are rejected.
- 7) ☒ Claim(s) 3-6 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 7, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. in view of Trans et al. and Martin et al..

Regarding claim 1, Li et al. disclose almost all the subject matter claimed as follows. Li et al. teach estimating indirect variables using indirect variable vector  $\Phi_n$  derived from impulse response matrix  $G(\tau)$ , note equations 8, 14, 15 and page 6 lines 6-18. Li et al. teach a 3-dimensional complex vector constituted by the transpose of three indirect variables  $\Phi_{1,n}, \dots, \Phi_{3,n}$ , which are used in the processes of timing recovery and frame synchronization, note page 11, line 6- page 12, line 9. Li et al., however, does not teach the details of tracking the indirect variable for the purpose of equalization of the received signal samples in dependence upon the tracked indirect variables. Further, Li et al. teach an IS-54 system, however, Li et al. do not explicitly teach the demodulator for demodulating equalized symbols found in an IS-54 system.

Trans et al. teaches a Channel Adaptive Equalization system which teaches the timing synchronization and equalization algorithm can be thought of as one tracking channel, note paragraph 0464. Trans et al. teach the two algorithms are fundamentally are the same as far as filter coefficient convergence is concerned, note paragraph 0464.

Martin et al. disclose a block diagram of a well known IS-54 receiver having a channel decoder following an equalization circuit, note figure 3B.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to use Li et al.'s synchronization algorithm with Trans et al.'s teaching of updating an equalizer circuit as a function of synchronization algorithm, since Trans et al. suggest in paragraph 0464 that the two algorithms are fundamentally the same as far as filter coefficient convergence is concerned. It would have been further obvious to characterize Li et al.'s IS-54 receiver with Martin et al.'s teaching of having a channel decoder for decoding the equalized symbols in an IS-54 receiver, since Li et al. suggest the system incorporates the elements of a standard IS-54 receiver in page 1, line 9.

Regarding claim 2, Li et al. further teach the claimed subject matter "TDMA communications system" note page 1, line 6.

Regarding claim 7, Trans et al. further teach the claimed subject matter "frequency offset" in paragraph 0464.

Regarding claim 9, see claim 7.

Claims 8, 10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. in view of Trans et al., Martin et al., and Dabak et al..

Regarding claim 8; as applied to claim 1 above, Li et al. teach a TDMA cellular system wherein estimated indirect variables, representing an impulse response matrix, are used for frame synchronization and symbol offset estimation. Li et al., however, does not teach the use of received signals from two spaced antennas.

Dabak et al. teach a Space-Time Transmit Diversity system wherein received signals from dual paths are multiplied by two impulse response matrices and then combined and decoded, see paragraph 0030.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify Li et al.'s indirect variables representing a single impulse matrix with Dabak et al.'s teaching of using two matrices at the receiver to recover a signal from a Space-Time Transmit Diversity system, since Dabak et al. suggest in paragraph 0007 that the modification would improve reception.

Regarding claim 10, see claim 8.

Regarding claim 11, see claim 8.

### ***Claim Objections***

Claims 3-6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Allowable Subject Matter***

The following is a statement of reasons for the indication of allowable subject matter:

Claims 12-20 are considered allowable because the present invention comprises a apparatus having a feedback path from an equalizer to a tracking unit for producing tracked

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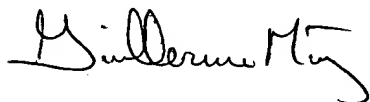
values of the indirect variables by the tracking unit. The closes prior art, Li et al. (WO 97/08867) shows a similar circuit including an apparatus for producing indirect variables representing an impulse response matrix. However, Li et al. fails to teach a feedback path from an equalizer to a tracking unit for producing tracked values of the indirect variables by the tracking unit. This distinct feature has been included in independent claim 12 rendering it allowable.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Guillermo Munoz whose telephone number is 703-305-4224. The examiner can normally be reached on Monday-Friday 8:30a.m-4:30p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 703-308-7728. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



GM  
July 22, 2004



JEAN B. CORRIELUS  
PRIMARY EXAMINER

7/22/04